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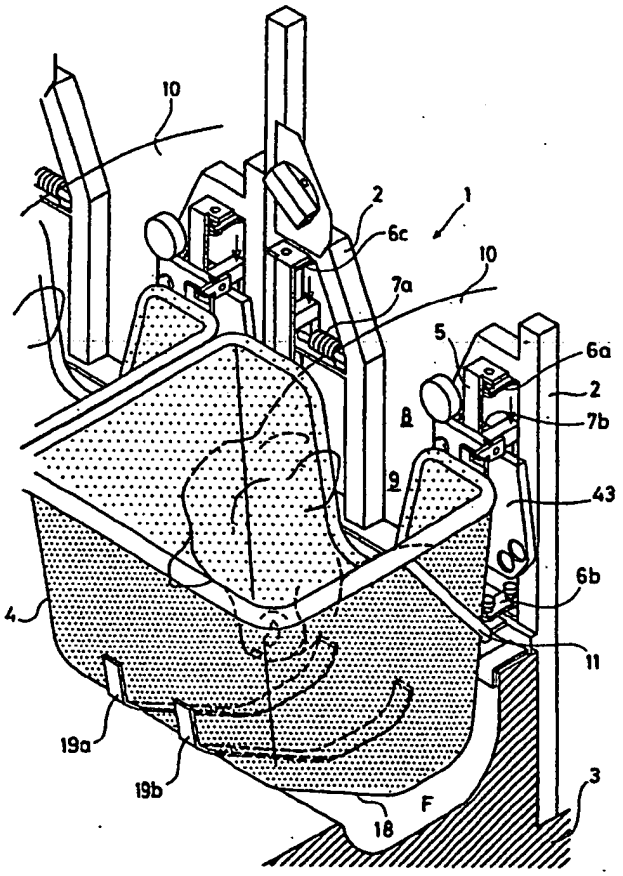
(54) Title: A FEED WEIGHING DEVICE

(57) Abstract

This invention relates to a feed weighing device (1) comprising a support means (5), a torque outweighing means (6) and a weighing or sensing means (7a, 7b). The support means (5), the torque outweighing means (6) and the sensing means (7a, 7b) are, in use, positioned on one side of said feed trough (4). The torque outweighing means (6) is adapted to outweigh forces originating from the fact that the feed trough (4) is positioned beside the sensing means (7a, 7b) or because of e.g. uneven spreading of feed in the trough (4).



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A feed weighing device

Field of the invention

The present invention relates to a device for weighing feed or the like in a feed trough for animals, comprising a support means adapted to carry said feed trough, a torque outweighing means adapted to connect said support means to a substantially rigid structure and to allow the support means to move in one main direction relative to said rigid structure within predetermined limits, and a sensing means provided to sense a parameter dependent on a force applied to said support means in said main direction and caused by feed present in said feed trough, for obtainment of a measurement of the weight of such feed. A device of this kind is known from WO 86/01977.

Background of the invention

By continuous research and development, it has been possible to obtain a larger amount of milk out of each cow. At the turn of the century, a normal cow yielded about 1000 kg milk per year. Today, the average milk yield per cow has increased to about 10.000 kg per year.

Today we know much more about the factors that influence the yield of milk than we did a hundred years ago. We know that with different combinations and amounts of different kinds of feeds, the cow yields varying amounts of milk. In the recent years, further research has been made to better understand the relation between the consumed amount of feed and the yield of milk.

Volume portioning of the feed by means of a scoop is the common way of feeding animals. For research purposes such volume portioning is not satisfactory, since it results in a very rough measurement of feed.

Furthermore, if the cows can reach each other's feed, the cows tend to steal from each other, which also affects the results.

In order to enable correct measuring of the amount of feed given to the respective cow, a precise instrument and a precise method for such measurement is needed. For this purpose more precise weighing devices have been developed.

The feed weighing device described in the above mentioned WO 86/01977, includes a horizontal frame carrying a cloth in such a way that the cloth forms a trough. The frame is connected to a weighing unit, which in turn is connected to a microcomputer. A transponder is hung around the neck of each cow, so that identification of the cow is enabled, and the amount of feed eaten by the cow can be calculated.

However, the described weighing device suffers from the drawback that the trough is difficult to empty and to clean inside, since then the cloth has to be swung upwards. Furthermore, the frame is not easily detachable so that the feeding table (a generally flat surface for the feed to be spread on, above which the weighing device is arranged) is freely accessible for e.g. cleaning and normal use of the feeding table; parts of the frame and the weighing unit still project from the wall, where they are mounted.

From "Technik der Rinderhaltung" (Landtechnik 1/2 -92, pages 45-46), another feed weighing device is known including a rigid trough, which is held in place by a joint member, which allows emptying of the trough by frontwards tilting thereof. When this trough is taken away from the joint, a holder means including the weighing unit remains in place. This is not very practical, because additional devices on the feeding table render normal use thereof difficult and cleaning thereof more cumbersome. Furthermore, the accuracy of the weighing results is not satisfactory, since uneven spreading of the feed in the trough may result in inaccurate measurements.

Furthermore, troughs of this latter kind cannot be easily nested, since connection elements on the sides of the troughs render nesting impossible. Moreover, this weighing device requires large space when several ones thereof are placed beside each other, since the design of such weighing devices results in inevitable spaces between adjacent troughs. Such spaces make distribution of feed to the animals more difficult, since feed tend to drop down to the floor between the troughs, which is also the case when cows eat, since they tend to spread the feed by throwing it around and away from the trough, causing inaccurate consumption measurements.

It is therefore an object of the invention to provide a feed weighing device adapted to carry a trough, which device does not obstruct the feeding table when not in use.

It is also an object of the invention to provide a feed weighing device adapted to carry a trough, which feed

weighing device can measure the amount of feed in the trough with high accuracy.

According to the invention, a feed weighing device of the initially described kind is characterized in that said support means, said torque outweighing means and said sensing means are, in use, positioned substantially on one side of said feed trough, said torque outweighing means being adapted to outweigh forces between the support means and the rigid structure in directions other than said main direction, such that the sensing means is substantially unaffected by a torque originating from the fact that the feed trough is positioned beside said support means and said sensing means. Thus, the feeding table is free from parts of the feed weighing device when the latter is not in use and the feed trough is removed, so that the feeding table is easy to clean and can unobstructedly be used as a normal feeding table.

Preferably, the support means, the sensing means and the torque outweighing means are arranged such, that said main direction is substantially vertically downwards.

Furthermore, said sensing means may comprise a force receiving member for receiving forces transferred by said support means in said main direction.

Advantageously, said torque outweighing means comprises at least two positioning members arranged at a distance from one another in said main direction and adapted to transfer forces between the support means and the rigid structure, such that forces originating from said torque are transferable in a first direction by one of said

positioning members and in an opposite second direction by the other one of said positioning members.

It is desirable that each positioning member has a guide spindle, provided with a first centering means, and a guide member provided with a second centering means forming a hole, wherein said guide spindle is connected in use to said rigid structure and said guide member is connected in use to said support means, or vice versa, and wherein said guide spindle is arranged in said hole in such a way that the first centering means of the guide spindle is adapted to interact with said second centering means of the guide member to position said guide spindle relative to said guide member.

Alternatively, at least one of said positioning members has a first and a second guide spindle, each being provided with a first centering means, and a guide member provided with two second centering means forming a first and a second hole, respectively, wherein said first guide spindle is connected in use to said rigid structure and said second guide spindle is connected in use to said support means, and wherein said first guide spindle is arranged in said first hole of said guide member and said second guide spindle is arranged in said second hole of said guide member in such a way that each first centering means of the respective guide spindles is adapted to interact with the respective one of said second centering means of the guide member to position said guide spindle relative to said guide member.

Preferably, each guide spindle forms an annular groove and each guide member forms an annular ridge around a said hole.

Advantageously, said torque outweighing means comprises two pairs of positioning members, the positioning members of each pair being arranged at a distance from one another in and aligned with said main direction.

When the feed trough is arranged above an animal's feeding table, the support means, the torque outweighing means and the sensing means are preferably arranged beside said feeding table. Thus, the feeding table is easy to clean and can unobstructedly be used as a normal feeding table.

Advantageously, said feed trough is adapted to be carried by two support members having proximal and distal ends, said feed trough being hollow and provided with a bar, which extends through the inside of the feed trough and to the outside thereof at two locations, the distal ends of said support members being connectible to said bar at said locations and the proximal ends being connectible to said support means. Said bar should extend through the inside of the trough in a way such that the animal will be hindered by the bar to throw away feed from the through, which would otherwise affect the measuring results and furthermore, when not in use, the trough can be easily nested for storing.

Moreover since no auxiliary holding means is required, a plurality of troughs can be arranged in a side by side relationship, requiring less space in the stall and allowing easier filling of the troughs and less spillage during filling.

Drawing summary

Specific embodiments of the invention will now be described by way of example, with reference to accompanying drawings, in which

Figure 1 is a front perspective view of two feed weighing devices according to a first embodiment of the invention, two troughs being connected to a rigid structure, the figure further showing in phantom two cows eating from the troughs,

Figure 2 illustrates a support member for one of the troughs shown in figure 1,

Figure 3 illustrates one feed weighing device in further detail,

Figure 4 is a front perspective view of a modified trough,

Figures 5A and 5B show details of the feed weighing device of figure 3, partly in cross-section,

Figure 6 is a perspective view of the rigid structure shown in figure 1, a recess being closed by a gate, another being open, and

Figures 7A and 7B illustrate details of the rigid structure and the gate shown in figure 6 for allowing adjustment thereof.

Detailed description of preferred embodiments

Figure 1 shows a feed weighing device 1 according to a first embodiment of the invention. The feed weighing device 1 is mounted on a substantially rigid structure 2, which is connected e.g. to the floor 3 of a barn or stall. The connection may be made permanent, as shown in figure 1. Alternatively, a substantially rigid structure may be removably connected to already existing posts or the like in the stall. The substantially rigid structure may as a further alternative be a part of the building, where the feed weighing device of the kind here in question is intended to be installed.

The feed weighing device 1 furthermore carries a trough 4 detachably mounted on a support means 5. The support means 5 is connectible to the substantially rigid structure 2 by means of a torque outweighing means 6 (cf. figure 5A) comprising four positioning members 6a,6b,6c,6d.

A sensing or weighing means is provided to support the support means 5 and, thereby, to sense the weight of feed present in the trough 4. The sensing or weighing means comprises two weight sensors 7a,7b of the kind sold by Captels S.A. in France under the designation "DFC", which weight sensors comprise strain gauges. The whole stress caused by the weight of the trough and its contents, is taken up by this kind of weight sensor. The sensing or weighing means may, however, comprise a separate force receiving means to take up the major part of the stress. This may be the case when piezoelectric sensors, fibre optic sensors or the like are used, which weight sensors do not have a force receiving function.

The substantially rigid structure 2 is provided with a recess 8 and an adjacent wall of the trough is provided with a corresponding recess 9 facing the recess of the substantially rigid structure. Said recesses 8,9 are adapted to fit an animal's 10 neck for allowing the animal 10 to reach down to the feed in the trough 4.

The trough 4 is made of a plastics material, such as a glass fibre reinforced resin or the like. In order to give desired stability to the trough 4, a trough holding means 11 formed by a bar 12, a pipe or the like is arranged around the outer periphery of the trough, see figure 2. A pair of connection plates 13a,13b is provided on an upper part of the trough holding means 11.

Alternatively, the trough 4 may be made of metal, preferably a light metal, such as aluminium. In this case, the trough holding means 11 may be excluded and said connection plates 13a,13b be mounted directly on said trough.

Figure 3 illustrates one feed weighing device as shown in figure 1, but without a trough. On the support means 5 a trough receiving means is arranged comprising a pair of bar receiving members 14a,14b and a pair of pivotable catches 15a,15b. Connection of a trough to the support means 5 is performed by supporting a lower part 16 of the bar 12 of the trough holding means 11 in the bar receiving members 14a,14b, each having a groove 17 into which the lower part 16 of said bar 12 fits. It is now possible to rest a lower part 18 of the trough 4 (see fig 1) on the floor on a pair of elongated metal strips 19a,19b forming protection for said lower part 18. The part 16 of the bar 12 and the bar receiving members

14a,14b form a hinge joint about which the trough 4 may pivot.

Subsequently, the trough is pivoted to a position where said connection plates 13a,13b touch said catches 15a,15b. By further pivoting the trough 4, the catches 15a,15b are forced to move away upwards and to let the respective connection plate 13a,13b pass an edge of the respective catch 15a,15b. The catches 15a,15b return automatically to their initial positions, whereby the connection plates 13a,13b are retained behind the edges of the respective catches 15a,15b.

The trough 4 can be released from the support means 5 by pivoting the catches 15a,15b upwards. Then, the trough 4 is free to be tilted away from the catches 15a,15b and to be lifted off and away from the bar receiving members 14a,14b.

Figure 4 illustrates a modified trough comprising a trough holding means having two elongated support members 20a,20b having proximal and distal ends 21,22, respectively. The feed trough is hollow and is provided with a bar 23, which extends through the inside of the feed trough and to the outside thereof at two locations. The distal ends 22 of said support members 20a,20b are connectible to said bar 23 at said locations and the proximal ends 21 are connectible to said support means 5.

Each elongated support member 20a,20b comprises at its proximal end 21 a load receiving portion 24 connectible to the support means 5 and at its distal end 22 a bar receiving part 25, which comprises an upper, straight guide rail 26 and lower guide rail 27. In the area of

the upper guide rail 26, the lower guide rail 27 is parallel thereto and extends further away from the support means by an extension 27a, which is inclined downwards. The distance between the upper and the lower guide rails is adapted to allow the bar 23 to be received therebetween. Furthermore, a stop member 28 is arranged between the upper and the lower guide rails 26, 27 to form a stop for the bar 23. A pivotable catch 15c,15d is arranged on each elongated support member 20a,20b to ensure retaining of the bar 23 between the upper and the lower guide rails 26,27. Each catch 15c,15d is provided with a curved part 29 and a recess 30, large enough to receive one of the ends of the bar 23.

Two guide plates 31a,31b are arranged on the support means 5, each at a distance from said elongated support members 20a,20b, respectively. The guide plates 31a,31b extend away from the support means 5, substantially parallel to the upper guide rail 26. At their ends 32a,32b, the guide plates 31,31b are inclined upwards.

For connection of the trough 4 to the elongated support members 20a,20b, the trough 4 is positioned with the ends of the bar 23 on the lower inclined guide rail parts. The trough 4 is tilted such that an upper edge 33 of the trough 4 is allowed to be received underneath the inclined part of the respective guide plate 31a,31b. Further tilting of the trough 4 results in pressure on the curved part 29 of the catches 15c,15d by the ends of the bar 23 causing lifting the catches 15c,15d. Even further tilting results in returning of the catches 15c,15d to their initial positions, in which they grip the ends of the bar 23. The upper edge 33 of the trough

4 is retained by the straight part of the guide plates 31a,31b.

Having the trough 4 disassembled from the support means 5, only the bar 23 needs to be taken away for allowing nesting of the troughs 4, so that troughs not in use do not require too much storing space. The elongated support members 20a,20b and the guide members 31a,31b are easily detachable from the support means (not shown).

The purpose of the bar 23 is not only to allow connection of the trough 4 to the elongated support members 20a,20b, but also to prevent an animal from throwing away feed from the trough 4. The bar 23 extends such through the trough that it hinders extensive movements of the head of the animal in the trough.

As previously mentioned, the support means 5 is supported by a sensing or weighing means and, further, connected to the substantially rigid structure 2 by means of a torque outweighing means in the form of two pairs of positioning members 6a-d (see figure 3). Figures 5A and 5B show a pair of positioning members, each positioning member of the pair comprising a guide member 34a,34b and a pair of guide spindles 35a,36a;35b,36b. One guide spindle 36a,36b of each pair of positioning members 6a,6b is adapted to be connected to the substantially rigid structure 2, whereas the other two guide spindles 35a,35b are adapted to be connected to the support means 5. One guide spindle 35a,35b of each pair of guide spindles is arranged in a first hole 37a,37b of its guide member 34a,34b, whereas the other guide spindle 36a,36b of each pair of guide

spindles is arranged in a second hole 38a,38b of the guide member 34a,34b.

Each guide spindle 35a,35b;36a,36b is provided with a first centering means 39 that forms an annular recess 40 having a V-shaped cross-section, whereas each hole of the guide member 34a,34b is formed by a second centering means 41 that is shaped as an annular ridge 42 having a V-shaped cross-section. Each first centering means 39 is adapted to interact with the annular ridge 42 of the respective second centering means 41 for axial positioning of the guide member relative to the relevant guide spindle. Alternatively, each guide spindle 35a,35b,36a,36b may be provided with an annular, V-shaped ridge and the guide member 34a,34b with an annular, V-shaped groove.

As shown in figure 5A, the guide spindles 35a,36a of the positioning member 6a are arranged in the holes 37a,38a of its guide member 34a in such a way that they abut against those respective parts of the hole forming ridges, which are situated most remote from each other, whereas the guide spindles 35b,36b of the positioning member 6b are arranged in the holes 37b,38b of its guide member 34b in such a way that they abut against those respective parts of the hole forming ridges, which are situated closest to each other (cf. the dotted line in fig 5A).

The support means 5 is adapted to move within predetermined limits in relation to said rigid structure 2. For allowing this, the two positioning members 6a,6b (and also the two positioning members 6c,6d) are hingedly connected to the support means 5 and the rigid structure 2 at a distance from one another in a main

direction M, in practice vertically, such that a parallelogram is created (see also figure 5B). A torque originating from the fact that the trough 4 is mounted beside said weighing or sensing means results in a first force transferable in a first direction by one of the positioning members and a second force of the same magnitude transferable in an opposite second direction by the other one of said positioning members. Since these forces are opposedly directed and of the same magnitude, the said torque is outweighed. Thus, any differences in such torques, e.g. due to different spreading of an amount of feed in the trough 4, will thus also be outweighed and, accordingly, only forces in the vertical direction (see arrow in figure 5B), caused by the weight of the feed, will be measured by said weighing or sensing means.

For reasons of accuracy, at least three positioning members are needed. Connection lines of three such positioning members suitably form an equilateral triangle and a weight sensor may be provided in the centre of the triangle. However, since in this case the substantially rigid structure includes a recess 8 for the neck of an animal, such an arrangement is difficult to accomplish and it is therefore more advantageous to use two pairs of positioning members 6a,6b,6c,6d arranged along two parallel vertical lines, as shown in figure 3. A weight sensor 7a,7b is provided between the two vertically spaced positioning members of each pair.

Even though the holes 37a,37b and 38a,38b of the respective guide members 34a,34b have been shown as through holes, it should be noted that the holes may be blind.

Certainly, also more than four positioning members may be used, even though four positioning members provide sufficient measuring accuracy.

Of course, it is not necessary to arrange the weight sensors 7a,7b within the area enclosed by the four positioning members; the weight sensors 7a,7b may be arranged at any suitable place to sense movement of the support means 5 in relation to the substantially rigid structure 2. It should be noted that the main direction M does not necessarily constitute a straight line.

It should also be noted that it would be possible to connect one guide spindle 35a to the support means 5 and to connect the guide member 34a hingedly to the substantially rigid structure 2, or vice versa. Furthermore, it would be possible to make the guide spindles 35a,35b,36a,36b integrated with the support means 5 and with the substantially rigid structure 2, respectively.

Figure 6 shows the substantially rigid structure 2, which separates the animal 10 from a feeding table F. A gate 43 provided in the recess 8 may be locked and opened by means of an electromagnetic lock means 58 (see figure 78). The electromagnetic lock means may be actuated e.g. by means of a signal from a microcomputer or the like, which, outgoing from stored information, allows a specific animal 10 having been identified by means of a transponder to open the gate and to enter the recess 8. The gate 43 is allowed to pivot in a vertical plane about a hinge 44, such that when the animal 10 presses the unlocked gate 43 downwards, the latter moves away downwards-sidewards as shown in the right part of the figure. When the animal 10 leaves the recess 8, the gate 43 swings back to its closed position, as shown in

the left part of the figure, by means of a counter-weight 43a, and the gate is locked in its closed position, such that an animal 10, which is not allowed to enter the recess 8, is prevented from doing so. Instead of a counter-weight, a spring means may be provided. The gate may also be opened by means of a motor or the like.

As shown in figure 7A, the substantially rigid structure 2 and the gate 43 are adjustable such that the feed weighing device is adaptable to growing animals or animals of different sizes.

Said adjustability is obtained by means of a bar 45 (shown in triplicate in figure 7B), which comprises a horizontal part 46, a vertical part 47 and an inclined part 48 connecting the horizontal part 46 to the vertical part 47. Furthermore, a plate 49 is connected to the lower portion of the vertical part 47 (see figure 7B). The horizontal part 46 and the plate 49 are provided with apertures 50 corresponding to apertures (not shown) in the substantially rigid structure 2. Screws 51 are entered through two corresponding apertures of the horizontal part 46 of the bar 45 and the rigid structure 2, and of the plate 49 and the rigid structure 2, respectively.

A hinge means 52 comprising a base member 53 having a hole 54 and a hinge member 55 is vertically displaceable along said vertical part 47 of the bar 45. The base member 53 is furthermore provided with apertures 56 corresponding to apertures 57 in the vertical part 47 of the bar 45, for allowing vertical adjustment of the hinge means 52 in relation to the vertical part 47 of

the bar in a similar manner as described above for the horizontal adjustment.

The above mentioned electromagnetic lock means 58 is connected to the hinge means 52 in such a way that the hinge member 55, the base member 53, the gate 43 and the electromagnetic lock means 58 form one unit, which is displaceable along said vertical part 47 of the bar, only needing unscrewing the screws.

A simple and inexpensive possibility of adjusting the recess 8 for different sizes of animals is hence obtained. Of course, also other connection means than screws and apertures may be used. Furthermore, a second bar on the opposite side of the recess 8 may be provided.

Claims

1. A device (1) for weighing feed or the like in a feed trough (4) for animals; comprising

a support means (5) adapted to carry said feed trough (4);

a torque outweighing means (6) adapted to connect said support means (5) to a substantially rigid structure (2) and to allow the support means to move in one main direction (M) relative to said rigid structure (2) within predetermined limits; and

a sensing means (7a,7b) provided to sense a parameter dependent on a force applied to said support means (5) in said main direction (M) and caused by feed present in said feed trough (4), for obtainment of a measurement of the weight of such feed,

c h a r a c t e r i z e d i n that

said support means (5), said torque outweighing means (6) and said sensing means (7a,7b) are, in use, positioned substantially on one side of said feed trough (4), said torque outweighing means (6) being adapted to outweigh forces between the support means (5) and the rigid structure (2) in directions other than said main direction (M), such that the sensing means (7a,7b) is substantially unaffected by forces originating from the fact that the feed trough (4) is positioned beside said sensing means (7a,7b).

2. A device (1) according to claim 1, wherein said support means (5), said sensing means (7a,7b) and said torque outweighing means (6) are arranged such, that said main direction (M) is substantially vertical.

3. A device (1) according to claim 1 or 2, wherein said sensing means (7a,7b) comprises a force receiving member for receiving forces transferred by said support means (5) in said main direction (M).

4. A device (1) according to anyone of claims 1 - 3, wherein said torque outweighing means (6) comprises at least two positioning members (6a,6b) arranged at a distance from one another in said main direction (M) and adapted to transfer forces between the support means (5) and the rigid structure (2), such that forces of this kind are transferable in a first direction by one of said positioning members (6a) and in an opposite second direction by the other one of said positioning members (6b).

5. A device (1) according to claim 4, wherein each positioning member (6a) has a guide spindle (35a), provided with a first centering means (39), and a guide member (34a) provided with a second centering means (41) forming a hole (37a), wherein said guide spindle (35a) is connected in use to said rigid structure (2) and said guide member (34a) is connected in use to said support means (5), or vice versa, and wherein said guide spindle (35a) is arranged in said hole in such a way that the first centering means (39) of the guide spindle (35a) is adapted to interact with said second centering means (41) of the guide member (34a) to position said guide spindle (35a) relative to said guide member (34a).

6. A device (1) according to claim 4, wherein at least one of said positioning members (6a-d) has a first and a second guide spindle (35a,35b,36a,36b), each being provided with a first centering means (39), and a guide member (34a,34b) provided with two second centering means (41) forming a first and a second hole (37a,37b, 38a,38b), respectively, wherein said first guide spindle (35a,35b) is connected in use to said rigid structure (2) and said second guide spindle (36a,36b) is connected in use to said support means (5), and wherein said first guide spindle (35a,35b) is arranged in said first hole (37a,37b) of said guide member (34a,34b) and said second guide spindle (36a,36b) is arranged in said second hole (38a,38b) of said guide member (34a,34b) in such a way that each first centering means (39) of the respective guide spindle (35a,35b,36a,36b) is adapted to interact with the respective one of said second centering means (41) of the guide member (34a,34b) to position said guide spindle (35a,35b,36a,36b) relative to said guide member (34a,34b).

7. A device (1) according to claim 5 or 6, wherein each guide spindle (35a,35b,36a,36b) forms an annular groove (40) and each guide member (34a,34b) forms an annular ridge (42) around said hole (37a,37b,38a,38b).

8. A device (1) according to anyone of claims 3 to 7, wherein said torque outweighing means (6) comprises two pairs of positioning members (6a,6b;6c,6d), the positioning members of each pair being arranged at a distance from one another in and aligned with said main direction (M).

9. A device (1) according to claim 8, wherein the support means (5), the torque outweighing means (6) and the sensing means (7a,7b) form a single unit.

10. A device (1) according to any one of the preceding claims, wherein the feed trough (4), in use, is arranged above an animal's (10) feeding table (F), whereas the support means (5), the torque outweighing means (6) and the sensing means (7a,7b) are arranged beside said feeding table (F).

11. A device (1) according to anyone of the preceding claims, wherein said feed trough (4) is adapted to be carried by two support members (20a,20b) having proximal and distal ends (21,22), said feed trough (4) being hollow and provided with a bar (23), which extends through the inside of the feed trough (4) and to the outside thereof at two locations, the distal ends (22) of said support members (20a,20b) being connectible to said bar (23) at said locations and the proximal ends (21) being connectible to said support means (5).

12. A device (1) according to anyone of the preceding claims, wherein said substantially rigid structure (2) forms a further support means connectible to a floor or a post of a barn or the like, said rigid structure being provided with means forming a first recess (8) facing a corresponding recess (9) of the trough (4), the recesses (8,9) being formed such that an animal (10) is allowed to reach through the recesses down to feed in the trough (4), and wherein a gate means having a gate member (43) and a lock means is provided to allow or hinder access to said recesses by a specific animal by opening and closing said recesses (8,9), said gate member (43) being vertically pivotable about a hinge member (44).

13. A device (1) according to claim 12, wherein said means forming said first recess (8) comprises a substantially horizontal bar and a pair of substantially vertical bars, wherein at least one of said vertical bars is horizontally movable along said horizontal bar for allowing adjustment of the size of said first recess (8).

14. A device (1) according to claim 12 or 13, wherein said gate member (43), said hinge member (44) and said lock means form one integrated piece vertically movable along one of said vertical bars for allowing adjustment of the size of said first recess (8).

15. A device (1) according to anyone of claims 12 - 14, wherein said lock means is an electromagnetic lock connected to a microcomputer, and wherein transponders or the like are provided to identify the individuals of said animals, the information of a relevant transponder being transmittable to said microcomputer for giving a relevant signal to said electromagnetic lock, for locking or unlocking said gate member (43).

16. A device (1) according to anyone of claims 12 - 15, wherein said gate member (43) is provided with a counter weight (43a) as a sole returning force for the gate member (43) in a state other than closed.

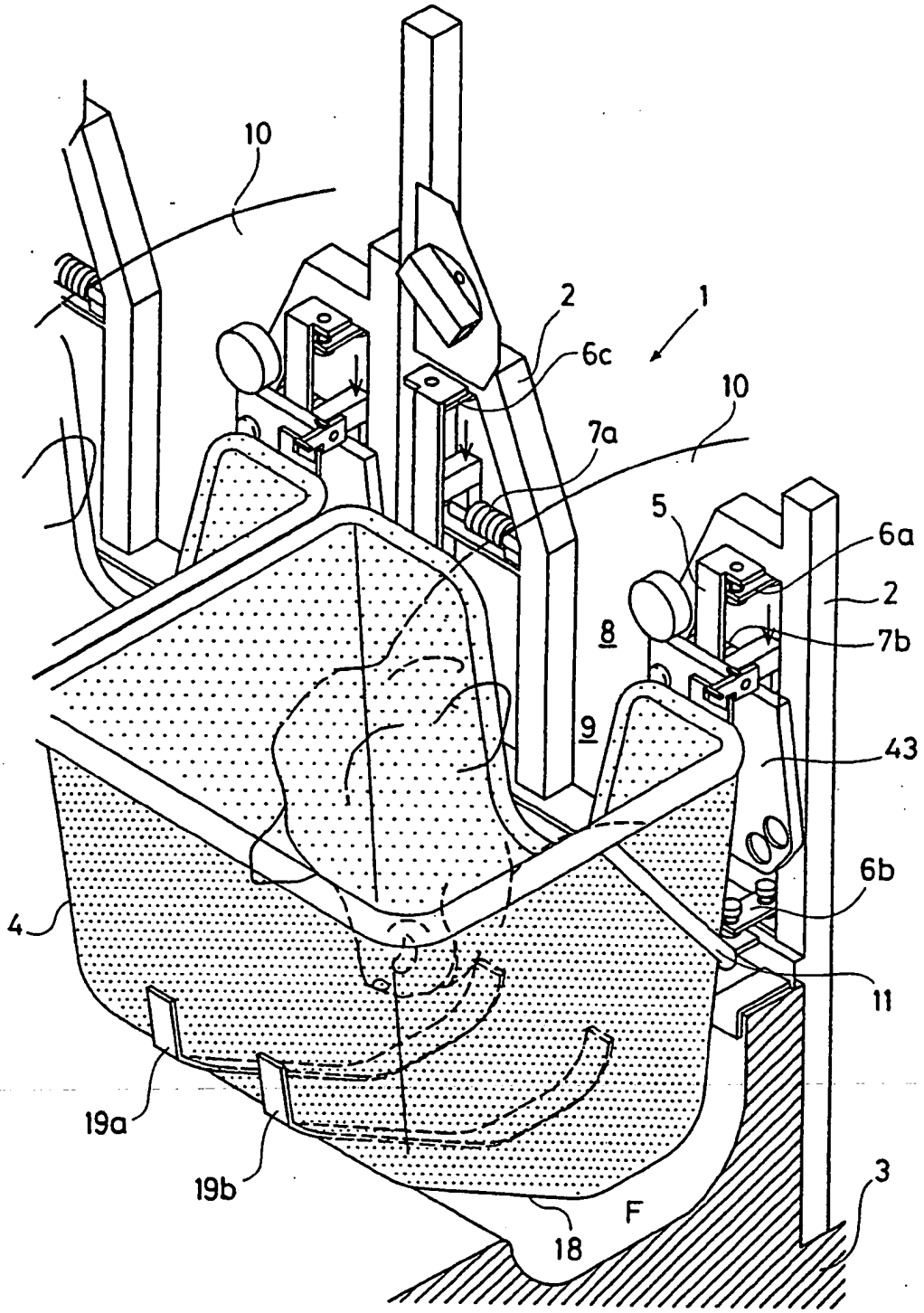

Fig.1

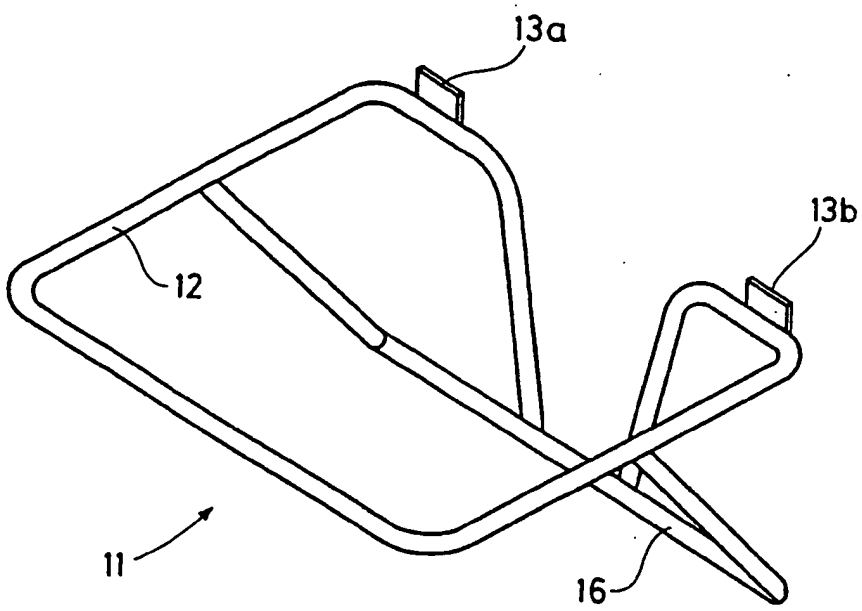

Fig.2

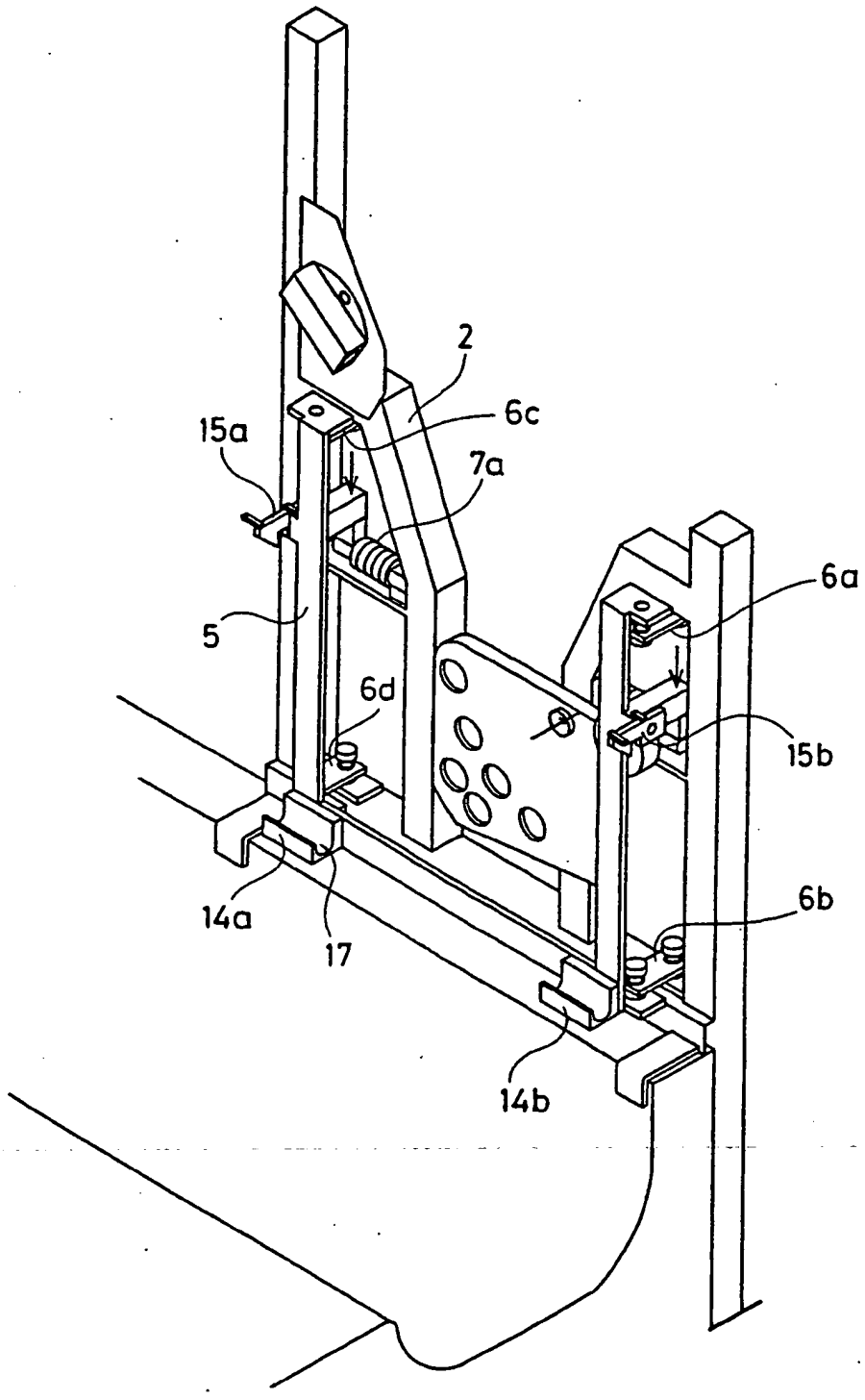

Fig.3

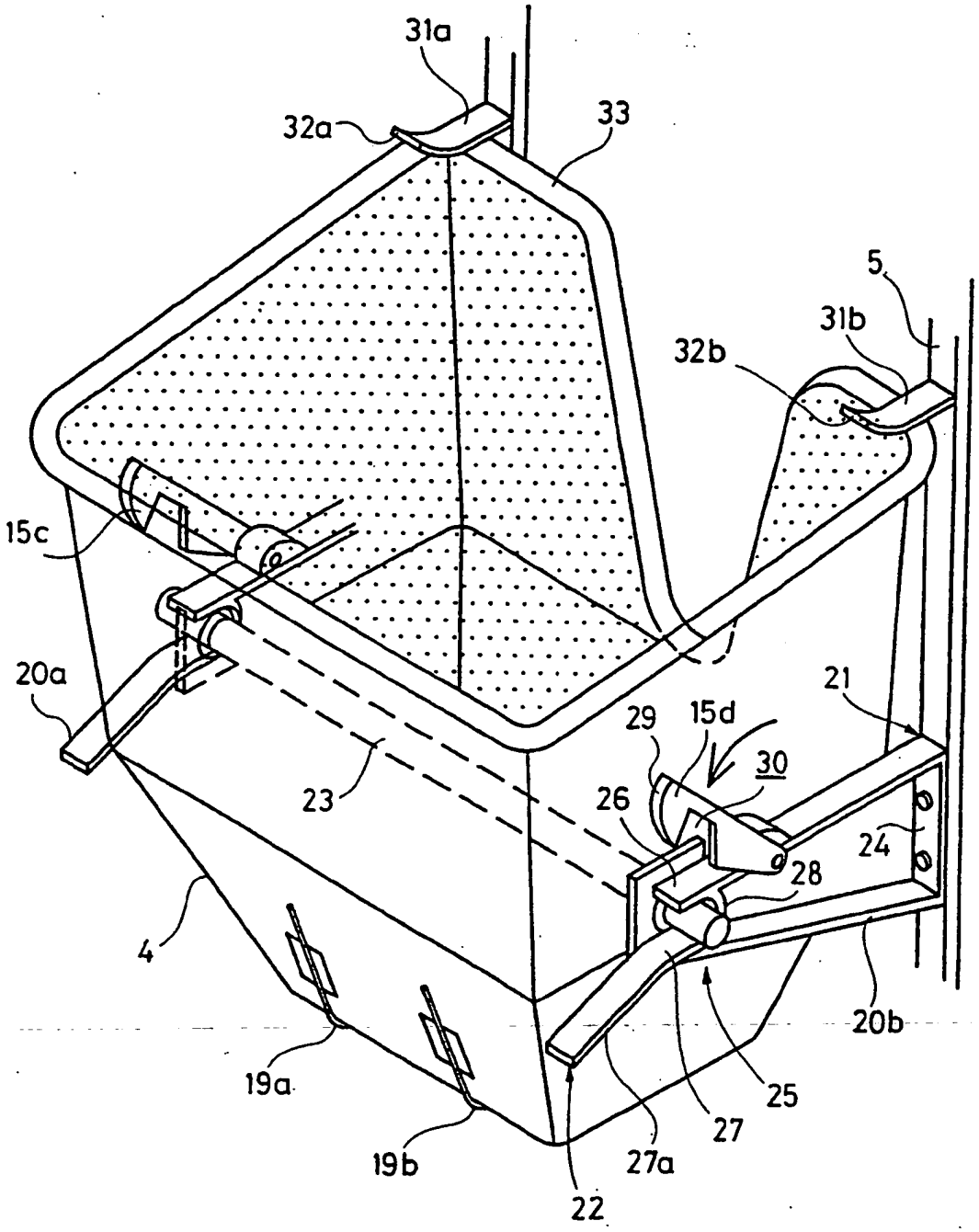
31a
32a
33
5
31b
32b
15c
20a
21
29
15d
30
23
26
24
28
4
20b
19a
25
27
19b
27a
22

Fig.4

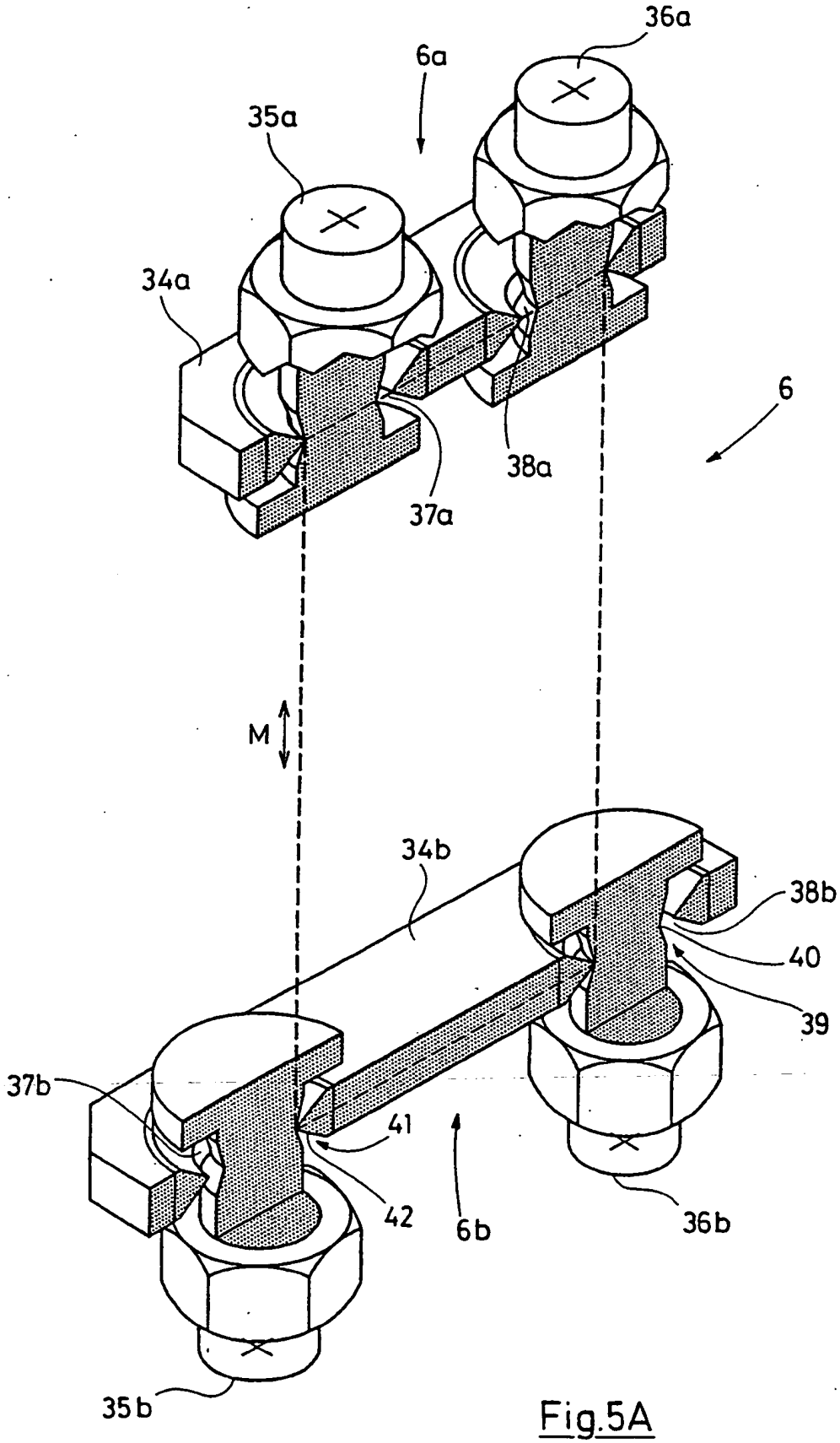

Fig.5A

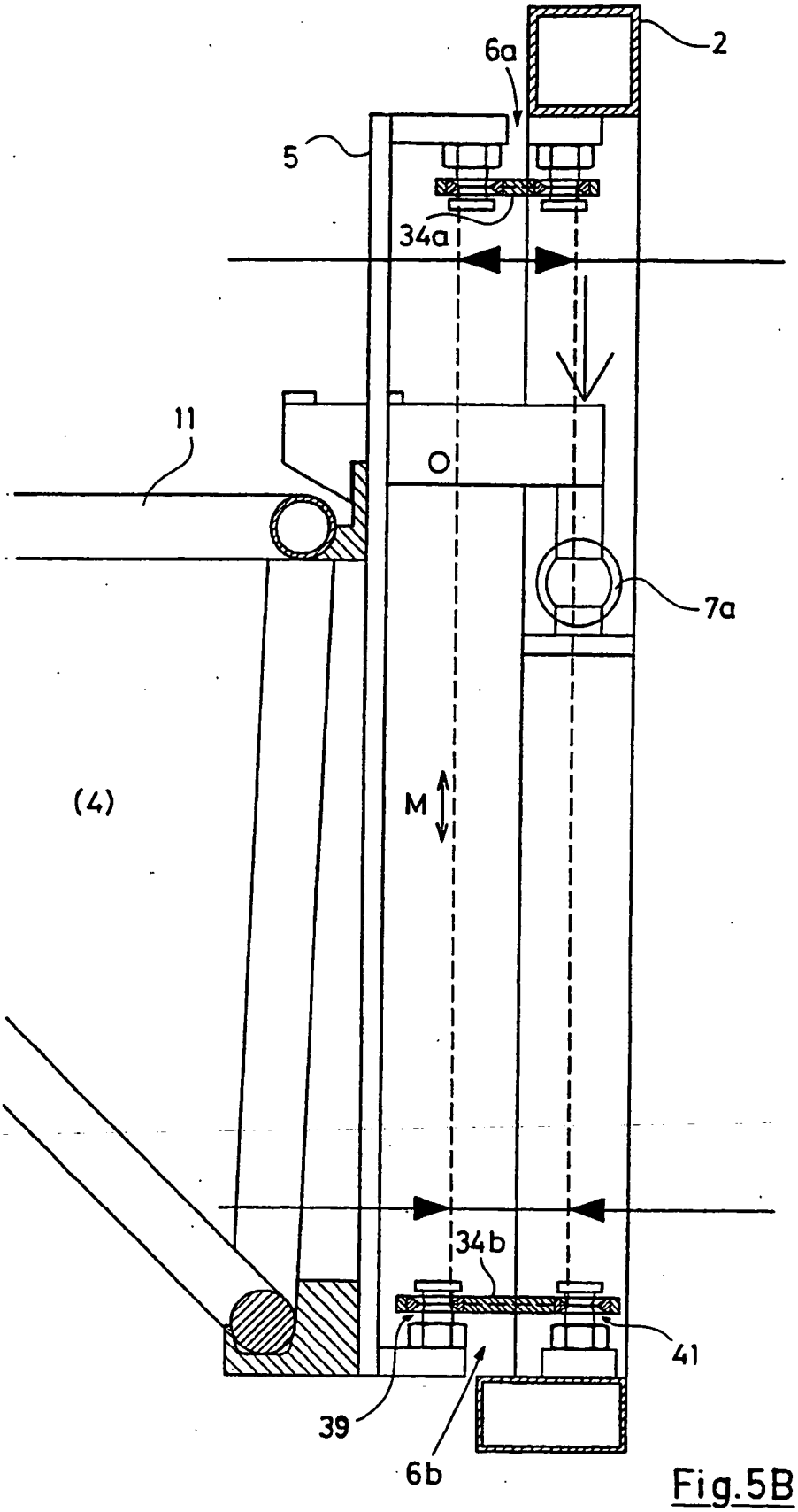

Fig.5B

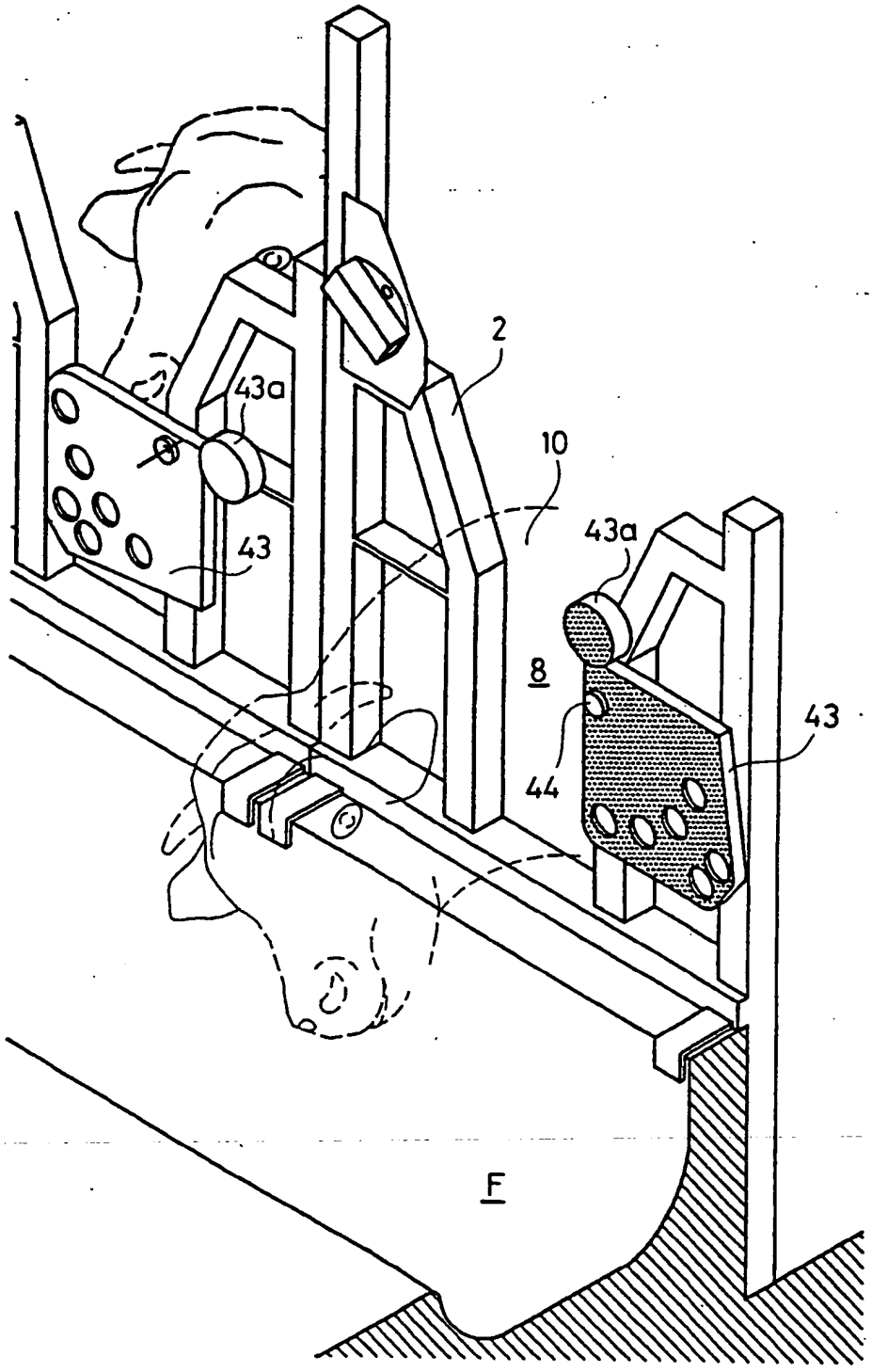

Fig.6

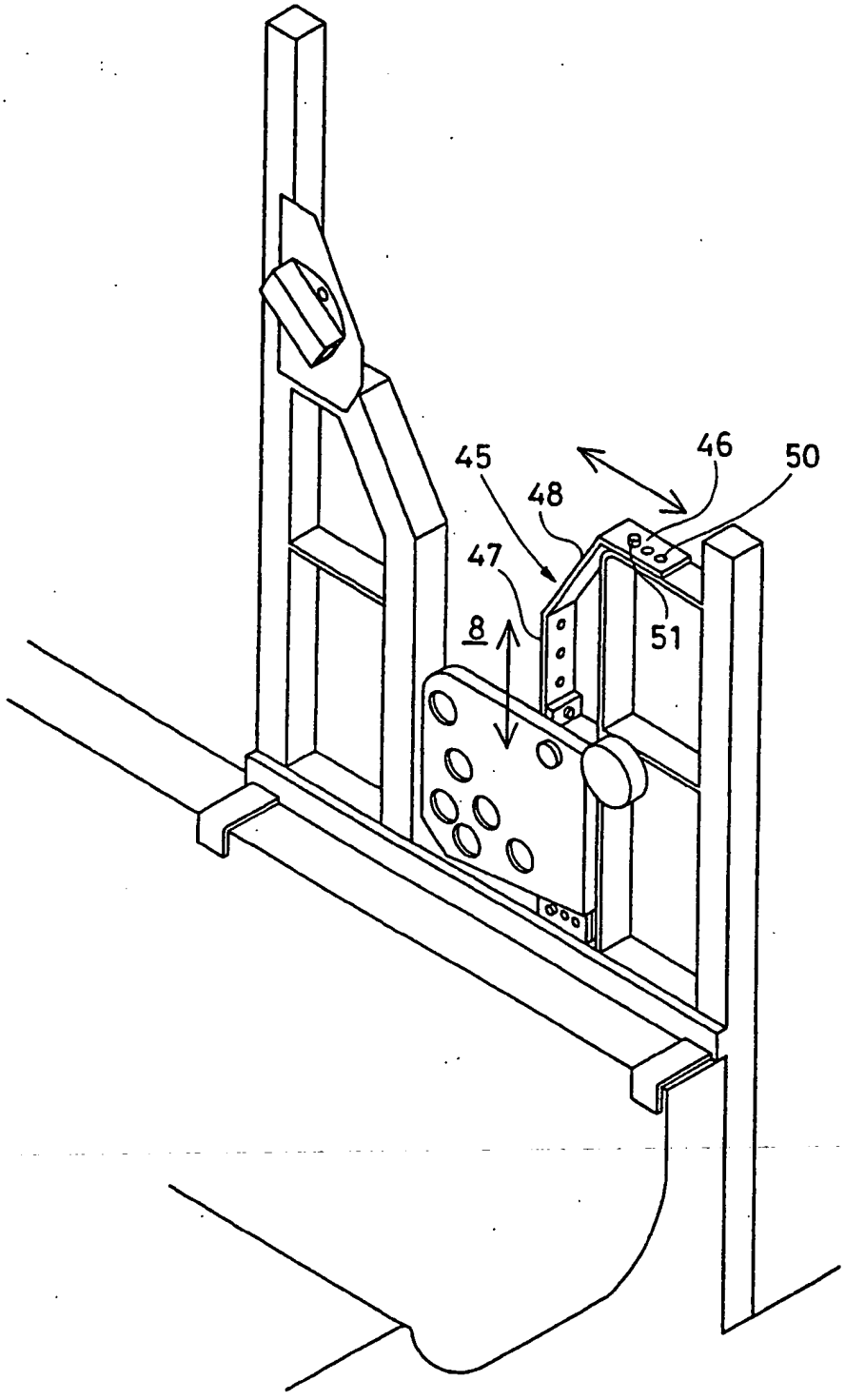

Fig.7A

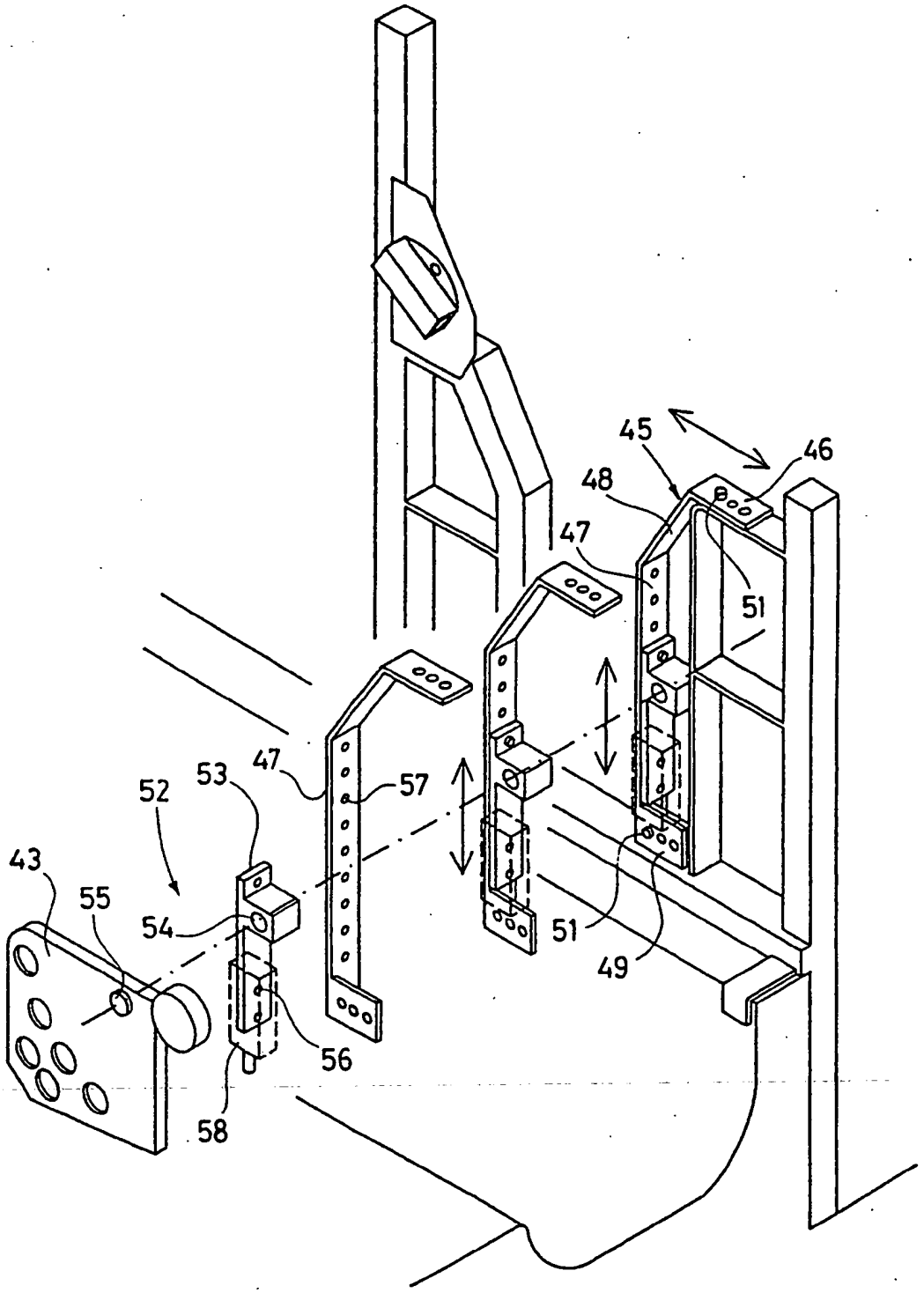

Fig.7B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 95/00177

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A01K 5/02
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A01K, G01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB, A, 2190574 (I.R. BRISBY), 25 November 1987 (25.11.87), page 3, line 6 - line 17, figure 4 --	1-4,8-10
Y	GB, A, 2111226 (YANATO SCALE COMPANY LIMITED), 29 June 1983 (29.06.83), page 1 - page 2, first paragraph, figures 3-5, 8-9 --	1-4,8-10
Y	GB, A, 2149131 (SHINKO DENSHI COMPANY LIMITED), 5 June 1985 (05.06.85), page 1, figure 2 --	1-4,8-10
A	WO, A1, 8601977 (ALFA-LAVAL AGRI INTERNATIONAL AB), 10 April 1986 (10.04.86) --	1-16

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 June 1995	15 -06- 1995
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Christer Bäcknert Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/05/95

International application No.
PCT/SE 95/00177

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 2190574	25/11/87	NONE	
GB-A- 2111226	29/06/83	AU-B- 535837	05/04/84
		AU-A- 8940782	05/05/83
		DE-A,C,C 3239002	11/05/83
		FR-A,B- 2515343	29/04/83
		JP-C- 1378729	28/05/87
		JP-A- 58073821	04/05/83
		JP-B- 61049608	30/10/86
		US-A- 4509610	09/04/85
GB-A- 2149131	05/06/85	DE-A,C,C 3439325	09/05/85
		FR-A- 2554231	03/05/85
		JP-C- 1485214	14/03/89
		JP-A- 60214227	26/10/85
		US-A- 4585083	29/04/86
		JP-C- 1469230	30/11/88
		JP-A- 60097220	31/05/85
		JP-B- 63016700	11/04/88
WO-A1- 8601977	10/04/86	EP-A- 0231182	12/08/87
GB-A- 2225868	13/06/90	CH-A- 680535	15/09/92
		DE-C- 3838906	23/05/90
		DE-U- 8913242	04/01/90
		FR-A- 2639110	18/05/90
		US-A- 4938301	03/07/90

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 95/00177

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB, A, 2225868 (SARTORIUS GMBH), 13 June 1990 (13.06.90)	1-16

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